Fuel saving by energy extraction?

CUTEC NEWS

FACTS · INFORMATION · ANALYSES

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Water and sludge

Thinking back to our childhoods, we all remember how much fun it was to play around with water and sludge, or mud – well, at least those of us who were little boys remember! – though the fun often came to a rapid end when our parents saw the state of us after such games. Sludge and water are still a fascinating combination, but for us as adults the appeal is rather different. In our department of Physical and Biological Process Technology, both substances are subjected to close scrutiny in a number of experiments. Firstly, in the field of sewage sludge dewatering, which is a key element in the operation of sewage treatment plants, being a major contributing factor to operating cost. An optimised mechanical dewatering process substantially reduces the cost of sewage treatment because the physical amount of sludge requiring disposal (an expensive operation nowadays) is then minimised. Prior to dewatering, the sludge has to be conditioned. This involves adding polymers to it to initiate a flocculation process so as to produce flocs enabling optimum dewatering, despite continually changing sludge properties. To that end, CUTEC has developed a new-style conditioning system which has been continuously enhanced on the basis of experience gained from numerous field trials in Germany and abroad. The system comprises a two-stage flocculation unit and a flocculation sensor. For all types of sludge tested to date, it delivers significantly improved dewatering results based on use of the most common dewatering apparatus currently on the market. If you had the chance to visit us in Munich during IFAT, you will have seen the latest generation of conditioning systems on display. We are proud to announce that the systems will in future be marketed by aquen-GmbH – the first independent business unit to be demerged from the CUTEC organisation. Likewise, the department headed by Professor Sievers is working on the development of processes to recover biogas from sewage sludge. The digestion of sewage sludge in large-scale treatment plants is a standard process to reduce sludge volumes and so cut operating costs relating to disposal. By deploying a low-pressure homogeniser, CUTEC has succeeded in intensifying the digestion process so that more biogas is obtained and the volume of sewage sludge requiring disposal is significantly reduced. As you see, the science of sludge can be really interesting, and moreover it can be very rewarding for operators of sewage treatment plants. Finally, after wallowing in so much sludge, a word about water: It is of course a vital resource for the human race, not merely in terms of drinking water, and so it is something to which we devote a large amount of our energies. Next year, Berlin will be hosting the fifth conference on Advanced Oxidation Processes (AOPs), and CUTEC will once again be helping to organise it. To read more about the conference, visit our website at http://www.cutec.de/aop5.php.

Best regards,

IN THIS ISSUE

CUTEC represented at the “Grüne Woche” in Berlin

Joint commitment to the new straw-powered heating plant. From left to right: Helfried Basse (Environmental Services, district of Hildesheim); Dr. Hanns Eberhard Liebing (Managing Director, Überlandwerk Leinetal GmbH); Reiner Wegner (District administrator, district of Hildesheim); Hans-Heinrich Ehlen (Lower Saxony Minister for Rural Areas, Food, Agriculture and Consumer Protection, Hanover); University Professor Dr.-Ing. Otto Carlowitz (Managing Director, CUTEC, Clausthal); Dr.-Ing. Stefan Vodegel (Confidential Clerk, CUTEC, Clausthal)

CUTEC showing at the 73rd “Internationale Grüne Woche”, the world’s largest agricultural and food industry trade fair, in Berlin? It’s only at first glance that this appears a contradiction: Rising energy prices have thrust the subject of renewable resources to the forefront of attention alongside long-established issues surrounding food supply and food quality and food safety. And it is in just that renewable resources field that CUTEC has built up years of experience and know-how based on its

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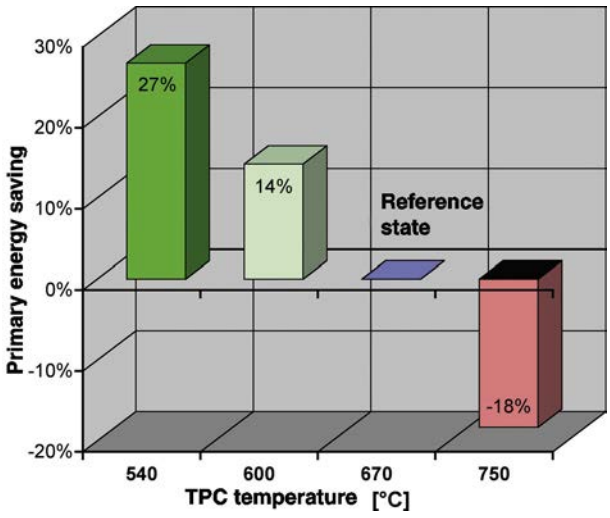
Development of energy-optimised exhaust gas purification concepts for paint drying in the automotive industry

In the final treatment of motor vehicle bodies at manufacturing plants, a series of paintwork coatings are applied and the bodies are then run through drying booths. The duration, heat-up rate, temperature, gas velocity and other factors in the drying process must be attuned to the various coatings being applied and to the body shape. During the process, a variety of exhaust air flows containing organic solvents are generated which must be cleaned before being released. The most common method currently employed by motor manufacturers in Germany and elsewhere in Europe is thermal post-combustion (TPC) of the exhaust air emerging from the drier with recuperative pre-heating of the exhaust air and utilisation of the waste heat in turn to heat the drier. In thermal exhaust gas purification, the reaction temperature to safeguard complete combustion and thus optimum conversion of the (toxic) organic compounds into the (non-toxic) CO_2 and H_2O compounds is maintained at a constant defined level by control systems.

Measurements of pure gas temperatures on various painting lines in representative operating states taken for orientation purposes have shown that values between approximately 250 °C and 310 °C occur. This corresponds to an increase in the pure gas enthalpy flow – or exhaust gas loss – of more than 60% over the design state. This means the driers have a much lower heat demand than the waste heat being supplied by the TPC process and associated waste heat recycling systems employed. Moreover, the reaction temperature in the TPC process cannot be lowered because of the quality of pure gas required. Nor is it feasible to increase the exhaust air pre-heating temperature in the TPC process, because this design configuration would result in a dramatic increase in size of the heat transfer area.

In view of these considerations, a joint research project was instigated together with Volkswagen AG and the Lufttechnik Bayreuth corporation, backed by funding from the German Federal Environmental Foundation (Deutsche Bundesstiftung Umwelt) aimed at introducing catalytic converter stages within the existing system designs in order to achieve a substantial reduction in oxidation temperatures. This enables a balance to be established between heat supply and demand which results in substantial savings of primary energy and so helps to reduce CO_2 emissions. The diagram above demonstrates the savings potential indicated by preliminary experiments carried out to date. Reducing the reaction temperature from 670 °C (reference state) to 540 °C results in a primary energy saving of around 27 %. To get down to a CO_2 emission level of 100 mg/m³, the reaction temperature would have to be increased to about 750 °C, which would necessitate an 18% increase in consumption of natural gas.



Primary energy saving as a function of the various reaction temperatures in a TPC system

The catalytic stage ensures a high degree of combustion even at low reaction temperatures and results in much lower NO_X emissions. The catalytic process does, however, entail a risk of chemical, mechanical or thermal deactivation. Consequently, the project aims to develop, test and, by demonstration, validate catalytic stages (including process-specific sacrificial sorbents to prevent catalyst deactivation). The project includes detailed analyses of the raw gas by CUTEC's in-house measuring unit and the associated laboratory, the drafting of specific energy balances for the individual painting processes and testing on the TPC unit operated at the Institute as well as by means of mobile catalytic converter units at Volkswagen. Assuming the developed process will be put into widespread use, CUTEC together with its partners is thereby making a major contribution to reducing CO_2 emissions. (ne)

Continuation from page 1

CUTEC represented at the "Grüne Woche" in Berlin

long-standing research work.

Showing as part of a joint regional stand, CUTEC presented one of the highlights of its ongoing development work: a demo version of a straw-powered heating plant generating distributed electrical and thermal process energy. Alongside institutions from the Hildesheim district, CUTEC demonstrated how the agricultural by-product straw can be utilised to generate energy as a cost-effective way of enhancing added value from agricultural operations. It is a project which is all the more interesting in terms of practical application because it is supplementary to, and not in competition with, the conventional food sector.

The local Hildesheimer Börde terrain offers ideal conditions for the project: high-grade soils and adequate rainfall for wheat growing. 35 yearly tonnes of straw are required. Removed minerals are subsequently returned to the fields. Thermal decomposition produces a gas high in calorific value, and an output of 5 MW electrical and 5 MW thermal can be generated. The plant is scheduled to go into operation in 2010. The technology will be of robust design, specified for a service life of about 20 years.

In conjunction with existing alternative energy recovery systems, this could well turn the district of Hildesheim into a role model for renewable energies, because it will be the first large-scale straw-powered energy-generating centre in Germany.

The response in Berlin was excellent. As well as politicians, administrators and agri-business executives, the stand also attracted large numbers of farmers and representatives of rural organisations from all over Germany and abroad, all of whom were very interested in the technical details and keen to discuss how the system might be transferable to their own particular circumstances. (kra)

Fuel saving by energy extraction?

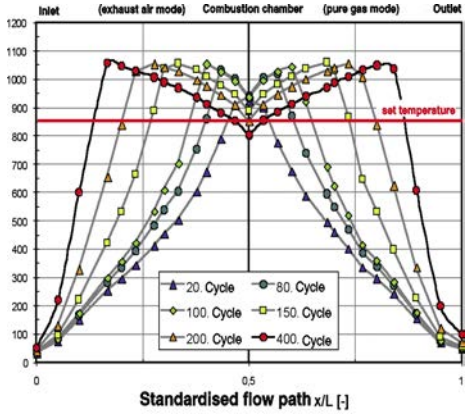
AiF research project to extract pure gas in RPC systems launched

Exhaust air contaminated by organic pollutants occurs in many branches of industry. In view of the fact that many of the polluting substances are subject to statutory emission limits, and they cannot be prevented by measures integrated into the production process itself, the emissions must be reduced by means of downstream systems.

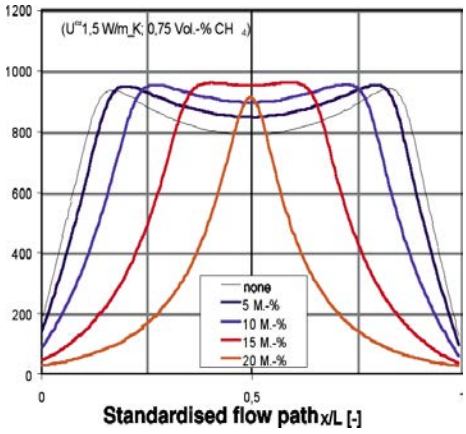
One method frequently employed for this by virtue of its low primary energy demand and robustness is thermal exhaust air purification with regenerative pre-heating of the exhaust air, known for short as regenerative post-combustion (RPC). This involves a flow-reversal reactor in which the combustible pollutants are largely oxidised at temperatures of around 850°C to form non-toxic compounds (see diagram below). The process heat is largely maintained within the process by means of ceramic storage masses, so that at concentrations of around two grams per standard cubic metre and above of combustible substances in the exhaust air such systems can operate without additional fuel (autothermal operation).

In order to maintain the necessary reaction temperature in the combustion chamber at low pollutant concentrations, fuel (e.g. natural gas or landfill gas) can be added to the exhaust air.

If the concentrations are higher than required by the autothermal system, it is seen that the maximum temperature transfers into the regenerators and the temperature in the combustion chamber decreases (centre diagram). However, it is precisely this temperature which is usually applied as the control variable. If the depicted scenario deteriorates to such an extent that the specified temperature is no longer attained, a standard control process attempts to compensate by increasing the fuel supply. This not only reinforces the response described, it also results in unnecessary fuel consumption. It was against this background that the "Otto von Guericke" consortium of industrial research bodies (known for short as AiF) successfully applied for official funding to instigate a research project (registration number 15400 N/1) which was then launched in November of last year. The aim of the project is to develop a suitable control strategy for these operating states.



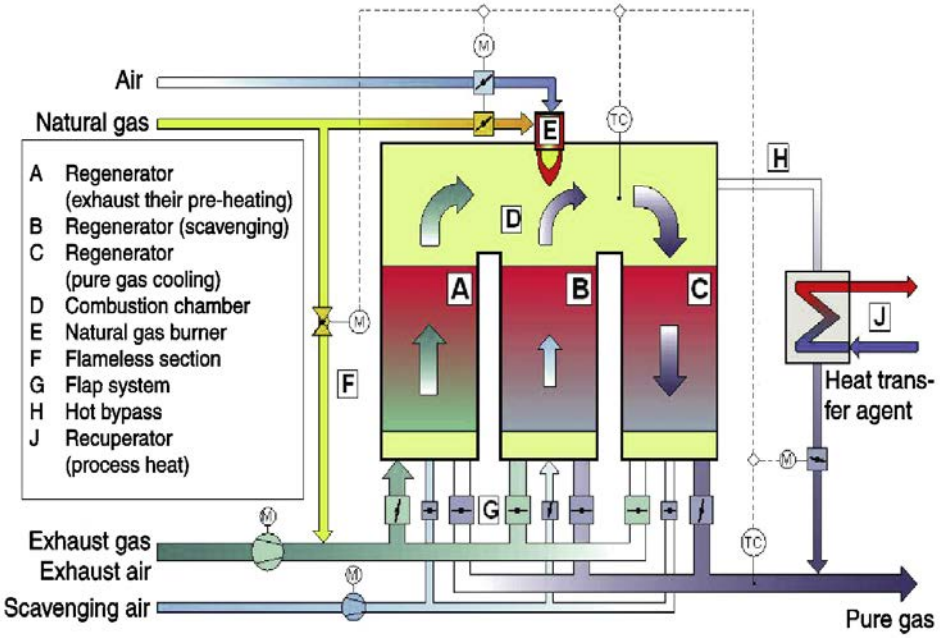
Measured temperature curves in an RPC system following a sudden rise in exhaust air loading



Influence of the extracted pure gas component on the temperature profile with simultaneous transmission heat losses (simulation)

Since the root cause of this problem (high exhaust air concentrations) cannot be avoided, the question which needs to be answered is how it can be counteracted. The problem was mathematically modelled by dynamic simulation of a regenerator. Many RPC systems – including the CUTEC pilot plants – feature a so-called hot bypass by which a portion of the pure gas flow can be isolated from the combustion chamber. Normally this is employed to extract usable heat from the process, in order to generate steam for example. The bypass can be instrumentalised in a useful way in this present case too. When pure gas is extracted, the heat transfer conditions in the regenerators change. As a result, the maximum temperatures move towards the combustion chamber and the temperature there rises (diagram at top right). This can be used to prevent the temperature falling below a specified level and to reduce energy demand.

So the question embodied in the heading to this article: "Fuel saving by energy extraction?" can indeed in this specific case be answered "yes". (rd)



Process diagram of an RPC system

DIARY

- 5th International Conference „Oxidation Technologies for Water and Wastewater Treatment"
  March 30 to April 3, 2009
  in Berlin
  www.aop-conferences.de

From biomass to energy source: the development of the Biomass Conversion Cluster

In Autumn 2005 CUTEC established its interdepartmental Biomass Conversion Cluster. Its initial role was to coordinate all the activities of the Institute within the framework of the EU RENEW project in which the Chemical and Thermal Process Technology departments were involved. Its strength lies in its combination of pilot plants in the field of pyrolysis, gasification and combustion operating at high temperatures with laboratory equipment configured to work with high pressures and featuring reactors for the deployment of different catalyst materials. This enables carbon and hydrogen input materials to be converted into products with entirely different properties (see diagram at right). The Cluster is now also dealing with projects relating to the generation of heat and power from materials such as cereals, synthesis gas purification, Fischer-Tropsch synthesis and hydro-cracking. In future it will also be looking into areas such as the production of methane from synthesis gas. The total value of contracts awarded to date is around € 4 million. Consequently, the Cluster has become one of the key financial pillars of the CUTEC organisation. The four projects below are landmark projects considered particularly worthy of note:

Conversion from silage to BtL

RENEW (01.2004-12.2007) was an EU project for the development of a process chain from biomass gasification THROUGH TO THE PRODUCTION OF SYNTHETIC DIESEL (**B**iomass **t**o **L**iquid = BtL). It involved the participation of some 30 European institutions, all coordinated by Volkswagen AG.

ABSART (12.2007-12.2010) is a project involving the planning, construction and subsequent optimisation of a synthesis gas purification system for BtL and methane production. (See article on next page.)

The tube-in-tube reactor (07.2004-07.2005) signified the development of a new reactor concept for Fischer-Tropsch synthesis at low temperatures aimed at improving the selectivity and turnover of reactions.

BioLog (08.2006-07.2008) is a project under the leadership of the Renewable Resources Agency (Fachagentur für nachwachsende Rohstoffe, FNR) for the development, testing and demonstration of new logistics concepts for biofuels involving a total of eight partners. CUTEC is participating in three segments of the project: Segment 6 is concerned with the procurement of renewable energy from crops; segment 7 involves accompanying economic and ecological research activities; and segment 8 encompasses the project coordination.

Since 2005 a number of industrially commissioned research projects have also been carried out into hydro-cracking, focused on development work for the reprocessing of waxes. Since 2006 CUTEC has been collaboratively working on preparations for the construction of a demonstration unit for a straw-powered combined heat and power station specified for a thermal output of 20 MW and an electrical output of 5 MW. The results obtained by CUTEC during the gasification and hot-gas filtration development work will be additionally applied to a commercial system.

The wider use of biomass as an energy source is a global necessity in view of the planet's dwindling fossil fuel resources. The focus of research activities over coming years will be in the fields of crop growing, optimisation of existing and new process lines to achieve greater material and energy efficiency, and the adaptation of technologies to organic residues and materials extracted in the course of food production, such as straw. It is possible that the relative contributions of the various energy sources from biomass will shift in future. For example, bio-methane (as an equivalent to natural gas) or liquefied petroleum gas (LPG) could become more important if the processes to recover those products from biomass could be made easier. The transition to different energy sources will pose new challenges with regard to logistics which will have to be overcome. Another factor which should not be overlooked in this context is the problem of processing different biomasses and transporting them to their conversion locations.

Consequently, there will be plenty of work for the CUTEC Biomass Conversion Cluster to do over the coming years. (vo)

IMPRINT

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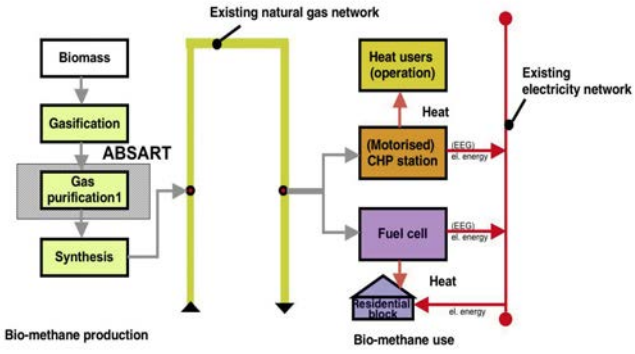
Development of a processing technology for synthesis gases: ABSART project

Aim: Synthesis gas purification for commercial applications

Introduction

In late 2002, CUTEC began working on a range of projects relating to the development of a process line for the production of **B**iomass **t**o **L**iquid (BtL) on a laboratory and pilot plant scale. The aim was to demonstrate the general feasibility of the concept featuring a circulating fluidised bed as the gasifier, a hot-gas filter to separate off the minerals, a simple gas purification system and a Fischer-Tropsch synthesis system in the fixed-bed reactor. No optimisation in terms of energy input and by-products took place at this stage. The intention is that in future the concept will be extended in terms of its applicability so as to produce not only BtL but also methane as an energy source from a wide variety of different biomasses. The raw material for this will come not only from wood – which is limited in availability – but also from cereal products (such as straw) or from organic residues (such as sunflower husks), though they will have a different chemical composition because they usually require the use of fertiliser during cultivation. This means the biomass would carry undesirable substances such as alkaline and earth-alkaline metals, phosphor, sulphur and chlorine. When decomposing the biomass into its base constituents by means of thermo-chemical processes, these contaminating elements must be removed from the raw gas before BtL or methane can be produced from the carbon monoxide and hydrogen chemical energy sources. The corresponding reactions take place on highly sensitive catalysts which demand high degrees of gas purity. The planning, operation and subsequent optimisation of a synthesis gas purification system able to meet the high gas purity demands is the object of the research project involving the development and testing of a processing technology for biomass-based synthesis gas and its exemplary implementation in the ArtFuel process – the project being known as ABSART for short. The extension of synthesis to methane as an energy source is taking place against the background of the high current and rapid expected future growth in demand for this chemical compound, more popularly known as natural gas. Germany has a well-developed natural gas distribution network, into which so-called bio-methane can be integrated. One of the strengths of the gas is that it can already today be converted into heat and power in distributed units such as combined heat and power stations, and in all likelihood in a few years also in fuel cells, with a high degree of efficiency. In the diagram above, setting out the steps in the production of bio-methane and its use in schematic form, the ABSART project is assigned to the Gas Purification 1 module.

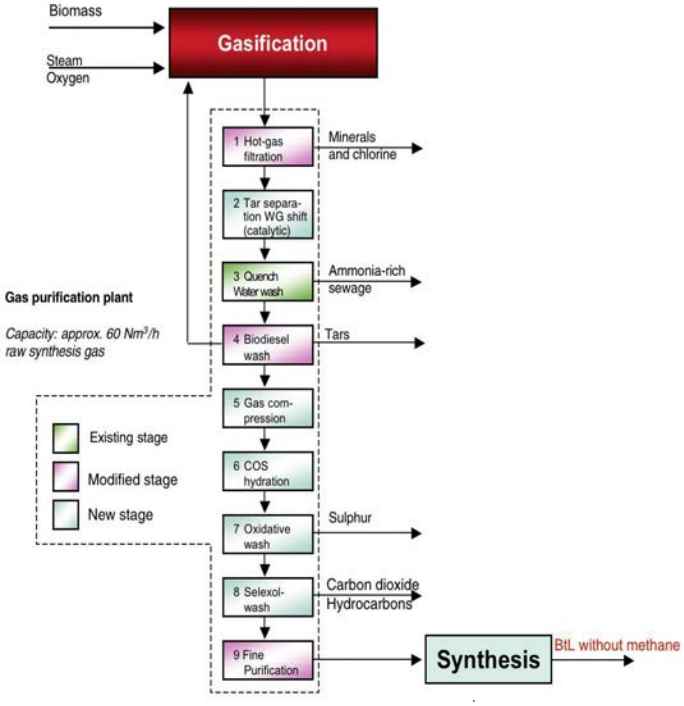


From biomass to heat and power in distributed units

Technical concept

The technical concept underlying the gas purification plant, featuring a planned capacity of 60 Nm³/h, is complex. It is mapped out schematically in the diagram at the bottom left. The key characteristics of the multi-stage raw synthesis gas purification process are:

a) Extraction of minerals and chlorine in the hot-gas filter
b) Washing-out of nitrogen in the water-based washer
c) Washing-out of (residual) tars in the rape-methyl-ester (= biodiesel) washer
d) Extraction of sulphur by hydration or oxidation in purification stages 6 and 7
e) Extraction of carbon dioxide and some hydrocarbons with organic solvents such as polyethylene glycol dimethyl ether (so-called Selexol washing)



Technical concept underlying ABSART

Timetable and financial conditions

The three-year project was launched in December 2007 and is scheduled to end on December 31, 2010. Its total cost is € 1.82 million, of which € 0.82 million is being covered by a grant from the State of Lower Saxony and € 0.32 million by funding from a private company in Lower Saxony. A particularly strong proponent of the project's instigation was the Lower Saxony Environment Minister Hans-Heinrich Sander. The motivation behind the project is to strengthen the State's agriculture and to assist its small and medium-sized businesses.

Establishment of a project supervisory board

In order to ensure the project remains focused on practical applicability and to collate technical suggestions, it was decided to establish a project supervisory board. Enquiries have already been made with a number of companies as to their participation. Positive responses have so far been received from companies in the plant manufacture and planning, power supply and automotive

Delegation from Niedersachsen visits China and Malaysia

CUTEC accompanies Trade and Industry Minister Hirche to Asia

The Niedersachsen Minister for Trade and Industry, Mr. Walter Hirche, led a 28-member business delegation to China and Malaysia from March 29 to April 5, 2008. CUTEC was represented by its Manager for International Operations, Dr. Theodore I. Onyeche.

The first point of call was Hong Kong, on the southern tip of China, where the delegation was welcomed by representatives of the German Foreign Chamber for Trade and Commerce. Representatives of the German Consulate General and the foreign chamber provided the delegates with an overview of the Chinese market. On the next leg of the journey, in Shenzhen, a business-matching event provided Dr. Onyeche with the opportunity to contact Chinese companies directly, to present CUTEC and to set out potential areas of cooperation. The discussions intimated him with the fact that the environmental situation in China is an increasingly important issue, because people there have come to realise that the rapid economic growth affects their environment. The identified environmental problems – acid rain, air pollution, inadequate access to clean drinking water, deficiencies in waste disposal – should be addressed and remedied, and the German know-how is expected to play a key role in providing sustainable solutions. According to a press release from the Niedersachsen Ministry of Trade and Industry regarding the trip, the Minister commented on the growing interest in environmental issues by saying: "I am very glad to see that environmental protection and renewable energy issues are increasingly being taken seriously by Chinese business and industry, and I am pleased that both sides have started thinking about establishing joint projects in those fields".

Managing director Walter Strakosch explains the engine overhaul services offered by MTU Maintenance

Niedersachsen delegation visits MTU Maintenance in Zhuhai, China – a subsidiary of aircraft engine manufacturer MTU Aero Engines

After China, the delegation proceeded to Kuala Lumpur, the capital of Malaysia, where pre-arranged one-on-one business meetings with individual executives of local companies were held through a networking event organised by the German-Malaysian Chamber of Industry and Commerce. Though Malaysia is better known for its exports of computer products, environmental protection issues are playing a greater role in its business life as the country seeks to reduce the impact on its environment in attaining its economic goals. Accordingly, the Malaysian Government intends to pass – and also implement – the relevant environmental legislation.

On his return to Germany, Dr. Onyeche emphasised that he had perceived a very strong will to protect and improve the environment in both China and Malaysia. The representatives of Chinese and Malaysian companies were evidently highly appreciative of the possibilities offered by the environmental technologies presented to them, though they did complain of a lack of reference projects in their own countries to provide them with a practical means of assessing them.

The targeted establishment of demonstration projects, as are required in both countries, could provide a boost to the export of German technologies. According to Dr. Onyeche, there is also a need for the general public in developing and emerging nations to become much more aware of the environment especially with regards to collecting waste and waste management systems because that is an essential element of any environmental policy and structure. He regards it as highly desirable that Germany should provide public subsidy for the establishment of demonstration projects in such countries especially in view of the fact that other countries have already gone down that road and indeed have acquired a number of relevant projects, even with less sustainable solutions. The purpose of the trip for CUTEC was to appreciate the local environmental situation, to assess the local level of awareness, to establish contacts with decision-makers in the business and politics in both countries visited and to present CUTEC's sustainable environmental technologies and services.

Business meetings in Kuala Lumpur: Dr. Onyeche discussing the environmental situation in Malaysia

Nigerian Ambassador to Germany Abdul Bin Rimdap visits CUTEC

The new Nigerian Ambassador to Germany, Ambassador Abdul Bin Rimdap, got information about CUTEC by virtue of its ongoing environmental consulting services in Abuja, Nigeria which raised his interest to pay a visit to the Institute. Hence, the Ambassador, accompanied by the Second Secretary M. L. Mohammed, was welcomed at the CUTEC facility in Germany on March 28, 2008, by the Managing Director, Professor Carlowitz and Manager for International Operations, Dr. Onyeche as well as Engr. Struve (CUTEC team Nigeria). In his speech, Professor Carlowitz gave a brief presentation of CUTEC and its fields of operation with special focus on the Institute's successful activities in Nigeria. As part of its environmental consulting contract with FCT, Abuja, the CUTEC team (German and Nigerian partners) undertakes the planning and construction of an integrated solid waste management system for Abuja. So far a number of soil analyses have been undertaken, training programmes have been devised on the subjects of solid waste, landfill engineering and sewage management, an environmental laboratory has been planned and environmental studies have been carried out. Academic exchange is being promoted by sponsorship of the doctoral works of two Nigerian environmentalists at the Technical University of Clausthal in Germany.

Mr. Mohammed, Professor Carlowitz, Ambassador Bin Rimdap, Dr. Onyeche, Mr. Struve (l. to r.) in front of CUTEC

The Ambassador in front of a model of a German landfill site

On his subsequent tour of the CUTEC laboratories and pilot plant halls, a number of selected systems and projects were demonstrated to the Ambassador. The Ambassador was impressed by the broad range of technologies and services offered by CUTEC, in particular the training programme tailored specifically to the needs of developing countries. He commented that Nigeria is already profiting greatly from its collaboration with CUTEC and that the general public in Nigeria has now developed encouraging environmental awareness. In conclusion, he promised to utilise his contacts with the Nigerian Government to support the launch of similar CUTEC projects in other states of the country. He also raised the prospect of a meeting between representatives of CUTEC and Nigerian President Umaru Yar'Adua on his upcoming visit to Germany. (on/wb)

Trade fair activities in Spring 2008

CeBIT 2008

At this year's CeBIT, the Modelling and Simulation department was represented by its system for predictive control of waste incinerators. The department showed its software solution, developed as part of an AiF project, which utilises neural networks to enable implicit modelling for the design of a future-oriented control concept. The demonstration involved the structuring of sensor data from plant operations in a neural network so as to generate forecasts of future waste incineration processes and indicate the results to an operator. Research and development into predictive controllers of this kind is currently being driven forward in a wide range of fields, as they enable even intrinsically difficult-to-forecast system characteristics, such as the influence of varying waste characteristics or ageing-related changes in items of process plant, to be identified and incorporated at an early stage.

CUTEC showing on the joint German pavilion

The system was received positively both by visiting politicians and by industry representatives. (reu)

WIREC 2008

In March 2008, CUTEC Manager for International Operations Dr. T. Onyeche and his assistant, Ms. W. Weber-Kubitzki exhibited for CUTEC at the trade fair accompanying the Washington International Renewable Energy Conference (WIREC) in the USA. Also in attendance alongside CUTEC on the joint German pavilion were a number of other environmental and energy companies as well as representatives of the German Federal Environment Ministry, the Federal Ministry of Trade, Industry and Technology and the Federal Ministry of Economic Cooperation and Development. The

Dr. Onyeche (right) in conversation with a visitor

Continued on page 8

CUTEC Scientific Advisory Board: Dr. Dieter Wullbrandt in profile

Dr. Dieter Wullbrandt

Dr. Dieter Wullbrandt has, since 2007, been Manager, Product Development and Technical Service with Nordzucker AG in Braunschweig. He was born in Braunschweig in 1953 and in 1974, following school graduation and military service, he began his scientific career studying chemistry at the town's Technical University. After graduating in 1979 and obtaining his doctorate in organic chemistry in 1982 under the tutorship of Professor Hopf, he worked briefly as a university scientific assistant before joining Hoechst AG in Frankfurt in 1983. Until 1987

Dr. Wullbrandt was head of a Hoechst laboratory researching into the recovery of pre-stages for pharmaceuticals and plant protectives by means of biotechnical processes. Over the next two years he worked in the field of process engineering, including on the development of a reactor for the cultivation of animal cells and on biological exhaust air purification. In 1989 Dr. Wullbrandt spent a year as head of the Biocatalysis Group. Then, from 1990 to 1999, he managed the Devoferm business unit of Hoechst subsidiary Aventis Research & Technologies, a developer of biotechnical processes carrying out contract fermentation for internal and external customers in Europe and the USA. It was in 1999 that he moved to the Nordzucker Group. Until 2003, Dr. Wullbrandt was scientific director of the "Institut für Technologie der Kohlenhydrate – Zuckerinstitut – e.V.", a research body investigating the technology of carbohydrates under the auspices of the North German sugar industry association. In 2003, following the conversion of the research organisation into a private company, Nordzucker InnoCenter GmbH, acting as the research contractor for Nordzucker AG, he was appointed managing director and scientific director, remaining in that post for two years. The diversification of the Nordzucker product portfolio to include sugar alcohols and artificial sweeteners saw the establishment in 2005 of a new subsidiary company, InnoSweet GmbH, devoted to the development and marketing of new artificial sweeteners and sweetening systems. From 2005 to 2006 Dr. Wullbrandt was managing director of InnoSweet GmbH and research and development director of parent company Nordzucker AG, before moving to his current post in 2007.

Dr. Wullbrandt is a member of numerous professional boards and works as an expert assessor for research projects. He was also a member of the supervisory board of the CUTEC ArtFuel project. Nordzucker and CUTEC have had close links for a number of years, so it was no surprise that Professor Carlowitz should appoint someone from Nordzucker to the Scientific Advisory Board of CUTEC. By virtue of his contacts and his role as head of the research and development function, the choice fell upon Dr. Wullbrandt. With regard to the goals which he considers CUTEC needs to pursue in future, he comments: "I see great potential for CUTEC especially in the fields of renewable energy from crops and, more generally, in delivering advanced energy recovery technologies. Such research fields are of course of great interest to the State of Lower Saxony, with its major agricultural resources, but they are also highly attractive to industry." In support of those aims, Dr. Wullbrandt intends to utilise the specialist know-how of Nordzucker and his own personal experience gained from many years in the industry and related professional bodies to further the work of the Scientific Advisory Board of CUTEC. (he)

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Trade fair activities in Spring 2008

significance of the event was demonstrated by the visit of President Bush to the show on the second day. In keeping with the Conference motto: "The power of independence", President Bush emphasised on the vital importance of focusing on renewable energy and the targeted independence from crude oil. A large number of government-sponsored projects are in progress in USA and Canada on renewable energy, waste management and fuel cell technology. During discussions with visitors at the CUTEC stand this change of attitude was also clearly identifiable. Specialists were extremely interested in the technologies developed by CUTEC and were keen to discuss how they could be integrated in future environmental projects. (wb/on)

New on the CUTEC team

Ms. Anne Kristin Grove (Dipl.-Ing.)

Dipl.-Ing. Anne Kristin Grove

On February 1, 2008 Ms. Anne Kristin Grove (Dipl.-Ing.) joined the Thermal Processes department of CUTEC. Ms. Grove graduated in process engineering from the Technical University of Hamburg-Harburg. Her degree thesis dealt with the thermal utilisation of rapeseed extract and rapeseed press cake. Following her studies, she worked as a project engineer in industry. At CUTEC, Ms. Grove is a valuable new addition to the scientific staff in the groundbreaking field of thermal biomass conversion. (wes)

Congratulations …

… to Michael Dreilich and Martin Bröhl on passing their final examinations. They both took their first steps into working life on August 1, 2004. While Michael was training as an electronics engineer in the electrical and electronic engineering workshop in the Equipment and Systems department, Martin began his training as an industrial mechanic in the CUTEC mechanical workshop. On passing their examinations, they have now successfully completed their training. We would like to take this opportunity to thank both of them once again and to wish them all the very best for their future. (wes)